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Making sense of elephants in the *shamba:* human-elephant interaction in Laikipia County, Kenya

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Abstract
This article applies sensemaking theory to instances of human-elephant interaction to understand how farmers make sense of elephants in their crops and how this fits into a broader discussion of human-wildlife coexistence. The concept of sensemaking is extended to discuss the institutional context of wildlife management and the role this has on the individual farmers' enacting and selection when confronted with an elephant in their crop. Analysis showed that respondents who had come into direct physical contact with an elephant reported to be more likely to refrain from attempting to scare elephants in the future and viewed them as dangerous. In comparison, farmers who had not experienced direct physical contact and subsequent injury from an elephant reported that they would continue to engage in interactions with elephants to remove them from their crops, viewing the elephants primarily as a pest. The discussion posited that institutional failures such as the lack of an efficient compensation policy, politics, and the top-down approach to wildlife policy indirectly impact on farmers' perceptions and subsequent sensemaking processes regarding their interactions with elephants in their crops. This article is intended as a snapshot of the potential for the application of sensemaking theory to human-wildlife interactions rather than a case for generalisation.

Keywords: Human-elephant competition, sensemaking, wildlife policy.

1. Introduction

The concept of human-wildlife interaction being described as conflict has been brought into question on the basis that conflict arises when one actor consciously strives to undermine the goal-seeking behaviour of another actor. This would then suggest that the rivalry for resources between wildlife and humans is not strictly conflict but should rather be described as competition or coexistence (Peterson et al., 2010). However this perspective does not discount that at the core, human-human or human-state conflict may be underlying these human-wildlife interactions (Hill, 2004; Knight, 2000; Peterson et al., 2010). From this perspective the invasion of crops by elephants can be seen as competition for resources, territory and personal safety rather than a form of conflict.

The experience of these wildlife interactions for the human is said to be two-fold, direct through the confrontation itself but also indirect through culture either as an influence on rituals and festivals or on one's cultural capital, through heroism for example (Knight, 2000). It is important to note the distinction between the subjective and objective nature of human-wildlife interactions whereby the pest animal may be a scapegoat of human society (Knight, 2000), damage caused by the animal may be exaggerated (Knight, 2000) or the damage to the resource may not adequately reflect the cost to the human (Hill, 2004). This subjective information regarding human-wildlife interaction is crucial as these beliefs are likely to determine subsequent attitudes and behaviour of humans towards their wildlife competition (Hill, 2004). The ability of households to cope with crop-raiding stress may vary widely within communities where one household can tolerate a certain amount of loss while the neighbouring household cannot (Naughton-Treeves & Treves, 2005). The threat to humans, particularly at the household level, can be very real and impact various members in terms

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of risk of injury, spread of disease, increased need to guard crops or livestock, and disruption of daily chores and schooling through increased guarding activities (Hill, 2004).

In the context of elephant management in Africa, Thouless and Sakwa (1995) describe three main periods. The first being in the 1960s where the overpopulation of elephants in national parks was the issue, then in the 1970s and 1980s the major concern was the impact of ivory hunting on elephant populations, then in the 1990s the issue of competition between elephants and humans came to the fore (Thouless & Sakwa, 1995). In Kenya, wildlife hunting has been banned since 1977 (GOK, 2009b) and heavy poaching and subsequent banning has altered the distribution of wildlife within the country. For instance, before the 1940s Laikipia County was not heavily populated with elephants but by the 1970s numbers had drastically increased, most likely due to poaching pressure further north (Thouless & Sakwa, 1995).

A study in Laikipia found the incidence of crop-raiding by elephants over a one year period to be 2420 crop-raiding incidents with 63% of cases impacting maize crops, although cases of extensive damage to the one crop were rare (Graham et al., 2010). Additionally, the predation of and competition with livestock, mainly hyenas but also lions and wild dogs, is also a problem in Laikipia (Georgiadis et al., 2007; Woodroffe et al., 2005; Young et al., 2005). Innovations designed at minimising the incidence of and improving the response to crop-raiding by elephants in Laikipia have focussed on electric fences (Thouless & Sakwa, 1995); beehive fences (King et al., 2009); the use of chili-based products such as smoke briquettes or rope fences (Graham & Ochieng, 2008); noise deterrents such as cow bells or banger sticks (Graham & Ochieng, 2008); torches (Graham & Ochieng, 2008); or the use of mobile phone technology (Graham et al., 2012); with varying success. Much of the research in human-elephant coexistence focuses on the technology required to deter the elephant from entering the crop, the patterns of crop-raiding by elephants and the impacts of various policies on conservation objectives. Yet the individual level cognitive processes of natural resource users' instances of encountering elephants and how this affects their wellbeing have largely been overlooked. This article aims to investigate how farmers make sense of their interactions with elephants in their *shambas* (crops) and how these interactions in turn impact their perceptions of wildlife management more broadly.

2. Theoretical concepts: Sensemaking and natural resources

The concept of sensemaking in essence refers to the manner in which an agent makes sense of an event based on previous experience in order to construct a plausible future, grounded in both individual and social activity (Weick, 1995). When faced with uncertainty, actors must somehow make sense of this situation which originally makes no sense. Through retention of previous experience, people enact their situation by noticing relevant cues and bracketing them for future action. As opposed to the interpretation of a ready-made world, through sensemaking the world itself is created by acting upon it, a prerequisite for making sense of it (Hernes & Maitlis, 2011). 'Sensemaking is intended to include the construction and bracketing of the textlike cues that are interpreted, as well as the revision of those interpretations based on action and its consequences' (Weick, 1995). Sensemaking focusses on the process of understanding and constructing events, incorporating both actor and context. Although a very broad body of literature, several streams or fields within 'sensemaking' or 'sense-making' can be distinguished, such as: Information Science (Dervin, 1983); Computer-Human interactions (Russell et al., 1993); Systems Engineering (Klein, et al., 2003); and Organisational Studies (Weick, 1995). While Dervin's (1983) work focuses on the individual idiosyncratic level, this article has employed the sensemaking ideas of Weick (1995) to

discuss sensemaking by the individual in a particular and critical moment including the collapse of sensemaking.

Weick (1995) states that there are seven properties of sensemaking which characterise it as (1) grounded in identity construction, (2) retrospective, (3) enactive of sensible environments, (4) social, (5) ongoing, (6) focused on and by extracted cues, and (7) driven by plausibility rather than accuracy. In other words, sensemaking is a 'process that is ongoing, instrumental, subtle, swift, social, and easily taken for granted' (Weick et al., 2005). Generally, sensemaking follows an enactment-selection-retention model (Weick, et al., 2005; Whiteman & Cooper, 2011) where actors notice and bracket cues from the environment, select a course of action based on this noticing and bracketing, and retain the experience for future sensemaking processes. Or perhaps more succinctly ' sensemaking can be treated as reciprocal exchanges between actors (Enactment) and their environments (Ecological Change) that are made meaningful (Selection) and preserved (Retention)' (Weick, et al., 2005). Noticing and bracketing, which make up the enactment process, are guided by mental models that the actor has acquired during the life experience (Weick, et al., 2005) and allows them to notice certain cues which deviate from the 'normal' and then bracket or label these cues. Actors organize the various equivocal inputs of the environment and enact the sense they make of these inputs or cues back into that environment to make it more systematic (Weick, et al., 2005). Based on this enactment, an actor then selects a course of action and retains the experience for future sensemaking processes.

A pivotal part of Weick's contribution to the development of sensemaking theory is through his work analysing the Mann Gulch fire disaster through this lens (Weick, 1993). Weick posited that the disaster and loss of life of the firemen in that bushfire in 1949 was due to the collapse of the sensemaking process where the sensegiver was unable to adequately pass on the required cues to his subordinates and these men were also unable to make sense of their environment. Whiteman and Cooper (2011) convincingly critique Weick's analysis of the Man Gulch disaster by suggesting that particularly in this context, like other contexts set in the natural environment, the sensemaking process must also include ecological cues which are considered dynamic (Whiteman & Cooper, 2011). They put forward the term 'ecological materiality' to note that the natural environment consists of physical and material elements which are not objects or things, but living entities in a system of energy flows and organic and inorganic matter (Whiteman & Cooper, 2011). Particularly in the context of sensemaking in elephant-human interactions the ecological context is indeed central. Rather than merely seeing the environment as 'objects', the environment should be seen as a dynamic system of living organisms which humans can manipulate but not control.

An advantage of applying a sensemaking approach to the conceptualisation of empirical data is that it combines an actor and structure perspective and allows for the social and physical contexts that influence an actor to be viewed from the perspective of how that actor then comprehends those stimuli, events and concerns in a broader holistic context (Wall & Olofsson, 2008). However the concept has been limited by the omission of the concepts of power, corruption (Mullen et al., 2006) and institutionalism until recently (see Weick et al., (2005) for some discussion of this). Some authors claim that the terminology used in sensemaking studies to date have, intentionally or otherwise, suggested agency to be a larger contributory factor than the internalization of structural components of the context within which sensemaking takes place (Weick, et al., 2005). This article would argue that both agency and institutional constraints are pivotal to the sensemaking process of farmers in relation to their interactions with elephants.

In the field of natural resource management, the concept of sensemaking has been applied to a range of areas such as farmer organizations (Peirano-Vejo & Stablein, 2009), the adoption of new technologies by farmers (Sneddon et al., 2009), environmental corporate social responsibility (Angus-Leppan et al., 2010), environmental dispute framing (Brummans et al., 2008), water contamination crises (Mullen, et al., 2006) and water use efficiency studies (Rose et al., 2004). This article has applied sensemaking theory to understand how farmers make sense of encounters with elephants in their crops and subsequently their perceptions of wildlife management more broadly drawing on the ecological, social and institutional contexts in which they are embedded.

3. Methods & procedures

3.1 The study location

Laikipia is one of 47 counties in Kenya (Burugu, 2010), situated in the Rift Valley and lies across the equator between latitudes 0◦ 17_ S and 0◦ 45_ N and between 36◦ 15_ E and 37◦ 20_ E (Thenya, 2001). A semi-arid area, Laikipia County consists of four districts and supports large numbers of wildlife including Kenya's second largest population of elephants (M.D. Graham & Ochieng, 2008). However, as there are no formal game reserves in Laikipia the wildlife move among private, government or communally-owned land. Large cattle ranches and conservancies make up the majority of Laikipia, often over 5000ha (constituting approximately 42% of Laikipia (Graham et al., 2010). Many of the group and private ranches of Laikipia are conservancies which either exclusively, or in conjunction with beef cattle production, engage in wildlife management. This wildlife management is often coupled with tourism activities such as accommodation and game drives and forms a public-private partnership with the Kenya Wildlife Service (KWS) to meet conservation goals.

As a result independence in 1963 many ranches in the south of the county were bought and subdivided into small farms through settlement schemes (Thouless & Sakwa, 1995). These areas of small-scale farming in Laikipia West have been particularly prone to elephant destruction in recent times through crop raiding (Gakio, 2011; Graham et al., 2012; Graham et al., 2010; Graham & Ochieng, 2008; GOK, 2009a; King et al., 2009) destruction of infrastructure, and compromising physical safety (Gakio, 2011; The Standard, 2012). This study focused on the area of small scale farming in close proximity to Rumuruti forest, close to Gatundia town in Laikipia West where one person was killed by an elephant in their crop in March 2012 (The Standard, 2012).

3.2 Respondent selection and interview process

This article is based on 8 semi-structured interviews with one key informant and seven farmers who've been directly impacted by an incident with an elephant in their crop either through the death of a family member, an attack which lead to personal injury, the destruction of private property or crop damage. The initial respondent was a key informant farmer in the area. Through this respondent the following seven respondents were selected via snowball sampling where the researcher purposively sought out those in the area who had been directly impacted by elephants, either physically themselves or through the loss of a family member. Two respondents that the researcher was directed to hadn't had physical contact with an elephant but had been in a situation where an elephant had entered the crop and had actively engaged in scaring it away. These two respondents were interviewed to allow for a different perspective of elephant-human interactions beyond physical harm and death. The interviews took place in July 2010 in the place where the incident occurred, except for two which took place in Rumuruti town (key informant) and Gatundia town (Respondent G).

This study follows two other periods of fieldwork in Laikipia (August-December 2011 and March 2012) investigating natural resource conflicts in the area. During these earlier periods it became apparent that crop raiding by elephants is a major issue in Laikipia, more particularly in the area surrounding Rumuruti forest in Laikipia West, near Gatundia town where elephants pass through between the forest and open areas under pastoralism or conservancies. Therefore a more in-depth, shorter period of fieldwork was undertaken to understand how farmers make sense of their interactions with elephants and how this influences their perceptions of wildlife management.

Each interview lasted approximately 1 hour and was undertaken in English, Kiswahili or Kikuyu (usually a mixture) through the aid of two interpreters. Extensive notes were taken at seven of the interviews and one interview undertaken completely in English was recorded and transcribed. Each of the interviews was analysed using Nvivo 8 software, firstly through meaning condensation (Kvale & Brinkmann, 2009) where the data were condensed into the various sensemaking components (enactment, selection and retention). The data relating to the signals and ecological, social and institutional contexts were categorized into these groups and a process of meaning interpretation (Kvale & Brinkmann, 2009) was used to analyse the relationship between the institutional aspects of the respondents' stories to the process of their sensemaking.

4. Results

4.1 Making sense of elephant encounters in Gatundia

Table 1 shows the overview of each of the seven respondents' interactions with elephants and their outlook on wildlife. Respondents claimed that usually elephants are on the move in search of food during the night and when seen in the morning it is because they have been 'delayed' in moving on from the night before. This is consistent with other studies which have found that crop-raiding by elephants is more generally a nocturnal activity (Graham et al., 2010).

Table 1 shows that two of the respondents were interviewed regarding a family member who had been killed by an elephant. While most of the incidents occurred during hours of darkness, the incidents of respondents A and B both occurred during daylight hours of the morning and in the pre-season crop preparation period. Respondent F's incident occurred in March, yet this was pre-harvest of a short-season maize crop.

4.1.1 Enacting: noticing and bracketing

Respondents stated that there were several signals they looked for when entering their crops to warn them that elephants were either in the crop or the area (table 2). Making noise by yelling or banging drums or sticks is a common method for neighbours to communicate with each other that an elephant is in the area. Similarly, the use of mobile phones has allowed for people to communicate either over long distances or between close neighbours to confirm that the warning has been heard. Other studies in Laikipia have found that mobile phone technology has improved early warning systems and communication between various stakeholders involved in the response to human-elephant incidents (Graham et al., 2012). However this study found limitations to the use of mobile phones for responding to elephants, mainly in its reliance on access to electricity. Many households in the study area do not have electricity within the home and rely on neighbours or commercial enterprises to charge their phones, which results in inconsistent mobile phone use and reduces the effectiveness of the technology for communication in crisis situations.

Table 1. Overview of respondents' encounters with elephants

Respondent	Relationship to person affected	Incident	Date	Time of day	Time of season	Future plans when faced by an elephant	Outlook on wildlife
A	Father	Death in crop	March 2012	~ 10AM	Preparing for seeding	Will scare elephants away	Nuisance
B	Himself	Damage to grain store	March/April 2012	~11AM	Pre-season (ate previous season's harvest)	Will leave elephants alone	Dangerous/ Scared
C	Himself	Crop damage	Ongoing	PM	Near harvest	Will scare elephants away	Nuisance
D	Himself	Crop damage	Ongoing	PM	Near harvest	Will scare elephants away	Nuisance
E	Himself	Injury/ Attacked next to crop	June 2011	~6PM	Mid-season, fruiting	Will leave elephants alone	Dangerous/ Scared
F	Himself	Injury/ Attacked in crop	March 2010	~8 PM	Near harvest	Will leave elephants alone	Dangerous/ Scared
G	Cousin	Death in crop	2008	PM	Near harvest	Will scare elephants away	Nuisance

Table 2. Signals and methods for deterring elephants in the crop

Methods for deterring elephants	Signals that an elephant(s) is present in the area	
	Ecological context	**Social context**
Lighting fire in between crops	Time of day – more common at night	People yelling to each other
Using torches (battery operated)	Time of season – more common at crop harvest	Use of mobile phones to call each other
Banging drums and sticks	Time of season – elephant calving	Other people banging drums and sticks
Making noise (yelling)	Sighting/hearing elephant(s)	

Respondents claimed that elephants were more likely to raid crops during night hours, were more aggressive when they were accompanied by their young and were also more likely to be in the crop during maize harvesting time (usually November-December, although March for short season maize), a pattern reflected in the respondents' reported incidents (table 1). The respondents shared common perceptions regarding how to scare elephants based on previous experience (table 3), usually making noise and using fire or torches to move them on. Respondents reported that in general elephants feed on several types of crops including maize, sweet potatoes, sugarcane and fruit trees, although it was also claimed that elephants have a particular taste for maize. A study on crop-raiding elephants in Laikipia found that they fed on 25 different crops species, but maize was the most frequently damaged crop (Graham et al., 2010).

During the later stages of the maize season the plants can reach over 2m tall, with thick vegetation which interrupts the farmers' line of sight beyond their immediate surroundings. This combined with trees surrounding the crop and darkness due to the night hours hinders the ability of the farmer to notice the elephant in the crop before it is within close proximity. It is often only possible for farmers to hear elephants once they are already in the crop and not when they are coming, although sometimes a 'grumbling sound from their stomach' can be heard. Similarly, dogs are able to sense the elephants and their barking is a warning that elephants are in the area. Once in the crops, the elephants can be heard uprooting the plants and destroying trees. Guarding crops during the night is common in the Gatundia area and farmers often light fires in anticipation of elephants moving through the area.

Each of the respondents, prior to their incidents, believed that scaring an elephant with noise would move them from their crops (table 3). On the morning that Person A died, elephants were moving through Gatundia after being 'delayed' on their way back to the forest after the previous night's foraging on crops. The neighbours in his area were shouting that an elephant was around, but he was unable to hear them and had no mobile phone contact. He was therefore unable to notice or bracket these signals. Similarly, Respondent F was unable to see the elephant in the crop next to him as he was riding his bicycle along the road due to the trees that form a barrier between the crop and the road. No one was making noise that an elephant was there, no dogs were barking and although elephants are common in the area he wasn't expecting an elephant to be behind trees next to him. He was unable to notice or bracket that the elephant was in close proximity to him.

4.1.2 Selection

Based on their enactment, each of the respondents selected a course of action which led them to interact with that elephant in some way. Person A, who had been unable to notice or bracket that an elephant was in the area was charged by the elephant as it was running away from other neighbours' crops. He was working in the crop, preparing the soil for the coming planting season and unfortunately didn't notice the elephant until it was charging him. He was unable to respond to this quickly enough to avoid being killed. Person G was living with his uncle and working as a casual labourer on farms near his uncle's. He was with neighbours banging drums and making noise to scare the elephant from the crop, based on previous experience of this having the desired effect. However unlike previous interactions, instead of moving away the elephant charged him and he was killed. It is interesting from a sensemaking perspective that the unfortunate outcome of the elephant-human interaction in these two cases stemmed from different degrees of successful enactment. While person A was unable to notice or bracket the elephant in the area and indeed his field, person G noticed and bracketed the presence of the elephant and selected a course of action

which drew him closer to the elephant, without anticipating a different reaction from the elephant or outcome for himself.

Table 3. Sensemaking in Gatundia

Person affected	Retention	Enactment	Selection	Retention - future
A	• Scaring elephants with noise and fire moves them on • Elephants are more likely to be around at night and at time of crop harvest	• It's morning and pre-planting and initially doesn't notice or bracket the elephant. • Doesn't notice or bracket other people making noise. • Finally notices and brackets the elephant charging him.	• Tries to run from the charging elephant. • He is killed.	N/A
B	• Scaring elephants with noise and fire moves them on • Elephants are more likely to be around at night and at time of crop harvest • Dogs get upset and make noise when an elephant is nearby.	• Notices and brackets other people yelling and elephants in the crop. • Notices and brackets that it is morning and pre-season. • Fails to bracket that the elephant will move for the grain inside the store (building).	• Actively makes noise to scare the elephant. • Elephant charges towards the grain store, breaking the fence, the building wall and eats the grain.	• Elephant is likely to charge. • Elephant is likely to destroy infrastructure and eat harvested grain.
C	• Scaring elephants with noise and fire moves them on • Elephants are more likely to be around at night and at time of crop harvest	• Notices other people making noise • Notices and brackets elephant's distance from himself.	• Actively runs towards the elephant making noise and scares the elephant away.	• Scaring elephants with noise and fire moves them on • Elephants are more likely to be around at night and at time of crop harvest
D	• Scaring elephants with noise and fire moves them on • Elephants are more likely to be around at night and at time of crop harvest. • Planting trees around crops which elephants don't like will help keep them out of the crop • Staying downwind of elephants blocks the smell and they won't	• Notices and brackets other people making noise. • Notices the elephant in the crop. • Brackets the wind direction.	• Makes noise to scare the elephant in the direction that he is downwind of the elephant. • Throws stones at the elephant. • Burns a tyre to mask his smell from the elephant. • The elephant moves on.	• Scaring elephants with noise and fire moves them on • Elephants are more likely to be around at night and at time of crop harvest. • Planting trees around crops which elephants don't like will help keep them out of the crop

	charge.			• Staying downwind of elephants blocks the smell and they won't charge.
E	• Scaring elephants with noise and fire moves them on • Elephants are more likely to be around at night and at time of crop harvest	• He notices and brackets other people making noise. • He initially doesn't notice the elephant in the crop because of the height of the maize. • He then notices the elephant and anticipates it will move away. Doesn't bracket that the elephant will charge him. • Doesn't notice or bracket two other elephants in the crop.	• Decides to make noise moving towards the elephant. • The elephant charges him. • He then turns away from the elephant, but the elephant catches and throws him. • His wife and neighbour come out making noise and the elephant moves away.	• Elephant is likely to charge.
F	• Scaring elephants with noise and fire moves them on • Elephants are more likely to be around at night and at time of crop harvest	• Doesn't notice or bracket the elephant in the crop next to him as he's riding his bike along the road. • Doesn't hear people yelling or making noise. • Not expecting an elephant to be near him when he's on the road.	• The elephant charges from behind the trees. • He falls off his bike. • The elephant charges and throws him into the furrow on the other side of the road. • Elephant steps over him not realising he is there and runs into the next crop to chase him. • Once the elephant has stepped over him, he runs away.	• Elephant is likely to charge.
G	• Scaring elephants with noise and fire moves them on • Elephants are more likely to be around at night and at time of crop harvest	• Is with other people all making noise. • Notices and brackets elephant. • Doesn't anticipate that the elephant will charge him.	• Moves towards the elephant making noise. • Elephant charges • He is killed.	N/A

Respondent F was unable to notice or bracket that an elephant was next to him and it charged through the trees knocking him from his bicycle and throwing him to the other side of the road. The elephant then chased after him, thinking he had been thrown into the crop on the other side of the road and in the process stepped over him as he lay in the furrow. Once the elephant had stepped

over him he ran in the opposite direction, with onlookers claiming the elephant then returned 'looking for him'. Person E noticed and bracketed an elephant in his crop. Based on previous experience of making noise and using fire to scare the elephant away he moved towards the elephant making noise. However, he had failed to notice two other elephants in his crop and as he moved towards the one elephant he had bracketed instead of being scared off it charged him. He turned around but couldn't move out of the way and was thrown by the elephant. His wife and a neighbour both ran into the crop banging drums and yelling which then scared the elephants away. Both of these respondents failed to notice and bracket the entire complex context they were in. Although person E noticed one elephant in his crop he failed to notice that there were two more, which is perhaps a failure to bracket that often elephants raid in groups.

Although it was morning and pre-planting season, respondent B was able to notice and bracket that an elephant was in his crops. Based on previous experience of scaring elephants with noise he attempted to scare the elephant on this occasion. Unlike previous interactions, instead of being scared away the elephant passed him and charged his grain store, breaking through the fence and the building to get to his harvested grain from the previous season's crop. Although he was aware that this was possible and elephants had damaged other people's grain stores in the past, based on the fact that it hadn't happened to him before it was plausible for him to expect the elephant to move off his land rather than destroy his infrastructure and feed on his grain.
Respondents C and D both had previous experience of scaring away elephants using noise, torches and fire. Based on this previous experience, respondent C chose to scare the elephant away using the same methods and was successful. Respondent D also had previously thrown stones at elephants and burnt tyres in order to scare them with the fire and mask his own smell. Respondent D stated that in order to scare the elephants away properly, he must always stay downwind so that they can't smell and therefore charge him. On this occasion respondent D had been able to notice and bracket the elephant in his crop and the wind direction and therefore chose to chase the elephant away by making noise. On this occasion the elephant moved on from his crop.

4.1.3 Retention and future sensemaking processes

Respondents C and D reinforced their existing perceptions of how to notice and scare away elephants from their crops and their retention for future interactions with elephants are unchanged. The respondents implied that they 'had the methods' to scare the elephants and therefore would continue using them, without updating their cognitive assumptions. Although acknowledging the risks, these two respondents appeared more steadfast and less concerned for their safety than other respondents, perhaps based on their previous experience of always scaring away elephants rather than being physically attacked by them. Respondents B, E and F all claimed that in the future, they will not attempt to scare away an elephant based on their previous interactions and the physical and psychological injuries these have caused them.

Respondents A and G acknowledged the danger involved in attempting to scare elephants out of the crop, yet stated that they will still attempt this in the future despite having a family member killed by an elephant. As respondent G stated:

> Instead of running away they [elephants] chase people so it's becoming a difficult thing… you can't stay in the house, you have to scare them away. You depend on the crops for revenue… You do your best to scare them away even when they're angry, you then run for your life.

Respondents A, C, D and G all stated that wildlife in Laikipia is a nuisance, while respondents B, E and F stated that wildlife is firstly dangerous and secondly a nuisance for agricultural production. The data suggests that those physically attacked by an elephant (respondents B, E, F) either their person or home, had stronger feelings of fear towards elephants and were less likely to disturb them in the future as compared to those respondents who had not felt this personally, even those respondents who had lost a family member but not been attacked themselves.

4.1.4 The principles of sensemaking

For each of the respondents (except respondent F) the ability to harvest their crop in order to provide subsistence food, in addition to revenue generated from the surplus of their crop, is important to their identity as a farmer and head of household. Respondents were able to look retrospectively at their enactment and selection processes which then contribute to their retention for future sensemaking processes. Several respondents (C, D) claimed that their past interactions with elephants had followed the same and therefore they would continue to deal with them in the same manner without the need to update their mental models or extraction cues. However, other respondents (B, E, F) stated that their specific incident had changed their perceptions of how to interact with elephants when the elephant didn't behave according to how their previous experience had suggested it would. Their previous experience told them that elephants can be scared away using noise and fire and therefore they hadn't anticipated the elephant to charge them. This experience now alters their future retention and likelihood of entering an elephant interaction. In this respect, the respondents had selected a plausible, rather than accurate course of action. They based their action on the fact that an elephant had not previously charged them and therefore it was plausible to assume that on this occasion the elephant would have been frightened away, further highlighting the notion of equivocality in sensemaking (Weick et al., 2005). Does this concept of plausibility explain why in some cases elephants were scared away and in others they charged or is this more related to the enactment process? In the case of respondent E was it his inability to notice and bracket two extra elephants in the crop which led the one he had noticed to charge him or was there another cue from the environment which he failed to notice? He claimed that he wouldn't have moved towards the elephant making noise if he realised that there were in fact three elephants in his crop. In the case of respondent F, if he had noticed the elephant in the crop next to him and selected not to ride passed it, would that course of action have guaranteed that the elephant wouldn't have charged him anyway? These cases highlight the dynamic nature of the ecological context within which these interactions take place and the concept of plausibility as with human-elephant interactions there is no guarantee of a certain outcome. Do we label respondents C and D experts in dealing with elephants in their crop or lucky? It seems that their previous experience has provided them with tools to look for cues from their environment but this doesn't ensure that these cues will remain valid or that the elephant will react to their actions in similar ways in the future.

There are several social factors which contribute to the respondents' sensemaking processes. When elephants are spotted in the area, neighbours communicate with each other in warning, either through face-to-face communication, yelling and making noise more generally, or through mobile phone contact. These communicative strategies are central to sensemaking where talking events bring activity into existence (Weick, et al., 2005). Other authors have stressed the ability of mobile phone technology to aid sensemaking through the enabling of contextually relevant and pertinent data to be communicated, providing opportunities for more conversations to take place and allowing for communicators to vocalize and reflect upon such data (Rogers et al., 2010).

4.2 Impacts of human-elephant interaction on humans in Laikipia

Respondents claimed that their interactions with elephants had impacted their lives in several ways and this impact will in turn influence their sensemaking processes. Obviously respondents A and G were grieved by a profound sense of loss, both of their family member but also that labour unit from their livelihood strategy. Respondents all spoke of the toll that guarding the crop during the night has on their productivity the following day and the financial cost of losing their crop to the elephants in addition to the damage of public infrastructure such as dams and water points.

> The damage is permanent. When I go to bed I never sleep comfortably, I'm always waiting for elephants. Sometimes I wake up in the morning and I'm tired, I never rested, and I'm expected to work during the day. So my productivity goes down.

Respondent B estimated that the timber to rebuild the fence and building that the elephant destroyed cost 10,000 KES (~US$120) and one month of labour while the elephant ate approximately 70% of the previous season's harvest. Respondent B also spoke of how the incident had resulted in a disruption of his sleeping patterns brought on by nightmares, an occurrence shared by respondents E and F. Similarly, the physical injuries sustained by respondents E and F are ongoing and impacting their daily lives. Respondent E suffered a dislocated hip, fractured leg and a lumbar spinal compression fracture which resulted in several operations and considerable pain which he still feels. This has meant that he is unable to lift heavy objects or work in the crop as he used to, leaving this burden on his wife. Respondent F suffered injuries to his ribs and neck and feels pain, particularly after heavy work. He is a secondary school student and the recurring pain from the injuries inhibits his ability to sit and study for long periods and makes him prone to headaches. The regular medical visits add to the household costs and often neighbours and community members assist in paying these bills.

Through the loss of the crops many farmers are forced to find casual employment to supplement their income. Large tomato and horticultural farms in the area provide seasonal employment opportunities but some farmers have relied on charcoal production as an alternative livelihood strategy. Although illegal in Rumuruti forest, respondents reported that some people are using the forest resource for this purpose while others are obtaining permits to produce charcoal on land outside the forest. Media reports claim that charcoal burning is responsible for significant reductions in the size of Rumuruti forest (Hoft, 2001).

The crop damage to farms by elephants is not a recent event. The Laikipia Annual Report of 1961 states that '…very large herds of elephant and buffalo moved out of the forests and did considerable damage on many farms' (KNA DC/LKA/1/11). One respondent remembered a particular bull elephant named 'Tom' who did much damage in the area and was eventually shot by colonial administrators.

While sensemaking theory and the results presented in section four explicitly relate to the social and ecological contexts of the natural resource conflict or coexistence situation, there is a gap in relation to the more structural aspects of the context in terms of institutional setting, power relations, policies and governance. Many scholars highlight the need to incorporate both structural or contextual and negotiator or personal effects will determine the outcome of a negotiation process (Li, Tost, & Wade-Benzoni, 2007) and in particular reference to natural resource conflict it is crucial for the resolution process designer or facilitator 'to explicitly and simultaneously balance contextual considerations with individual idiosyncrasies' at both the conflict assessment and

process design phases (Daniels et al., 2012). It is therefore crucial to also consider the balance between structural and idiosyncratic contextual factors when analysing natural resource management situations, particularly those of human-wildlife competition. While sensemaking theory has been criticised for omitting the institutional aspects or overemphasising individual agency in processes of making sense of a situation (Weick et al., 2005), this article extends this structure-agency discussion by drawing on the institutional elements of human-wildlife and specifically human-elephant interactions, through meaning interpretation analysis, of this Laikipia case to suggest that wildlife policies and priorities and the governance system impact on the sensemaking processes of farmers interacting with elephants in their crops. For example, the perceived inability of technologies to keep elephants out of crops or the lack of compensation following crop-invasion is likely to contribute to farmers' feeling of obligation to engage in risky behaviour to frighten elephants out of crops.

In relation to wildlife management in Laikipia and Kenya more broadly, respondents linked their difficulties at the farm level with government policies and actions at the national level where 'wildlife is beneficial for the country but not the common man'. As Hill (2004) states 'from the farmer's perspective, the Ugandan government behaves like an irresponsible livestock owner where wildlife is concerned', which can also be seen in the context of Laikipia where compensation policies are weak and government agents are reportedly slow to respond.

5. Discussion: Incorporating institutional aspects to sensemaking

5.1 Measures to prevent elephants in the crop

The most ambitious effort to control the intrusion of farmland by elephants in Laikipia has been the construction of a 163km electric fence to separate the agricultural region of the south from the ranching and rangelands of the North (Graham et al., 2012) which has been reported to be only mildly successful. However, many of the respondents claimed that if they were in a financial position to do so, they would erect a solar-powered electric fence ('energiser fence') around their own crops to create an extra barrier between the elephants and their crop. This implies that they have a certain level of confidence in electric fencing as a management tool. Other mechanisms such as the use of chili rope and bees (King et al., 2009) have been implemented in Laikipia in order to deter elephants from entering crops. However, respondents reported that neither option has been sufficiently successful. One respondent stated that his neighbour was a chili farmer, but having this crop didn't stop the elephants entering his fields. Similarly, in relation to bees he claimed that 'Bees at night are helpless! Maybe during the day but at night time they never come out'. One mechanism employed by respondents was to avoid planting species, where possible, which they believe elephants like. One man claimed that elephants have a strong taste for cashew nut trees and therefore he doesn't plant them, while another man claimed to have a stronger preference for the survival of his trees for their timber revenue and was therefore willing to forgo a small percentage of his food crops to keep his trees, which were planted in more protected spaces. Obviously in relation to widespread crops for human consumption such as maize, the competition between elephants and humans is intense and it would be difficult for farmers' livelihoods to avoid planting maize.

5.2 Compensation

None of the respondents had received any compensation, despite submitting the appropriate forms. According to the Wildlife (Conservation and Management) Act, Chapter 376, Section 62, of the Laws of Kenya, compensation may be applied for, to a District Committee, in response to the bodily injury from an animal. Alternatively, dependents of a deceased person killed by an animal

may also make application for compensation, with the funds awarded 'payable out of moneys provided by Parliament for that purpose' (GOK, 2009b). The current maximum amounts, as of 1st July 2006 are 50,000 KES (~US$600) 200,000 KES (~US$2400) for injury and death respectively (KWS, 2012). The Kenya Wildlife Service (KWS) are the facilitating institution for administering compensation cases and are mandated with managing Kenya's wildlife resource. The respondents felt that KWS, and by extension the government in general, value wildlife above the common Kenyan citizen. Respondents discussed KWS' fast and efficient reaction to the injury or death of an animal as compared to the perceived slow and inefficient response to wildlife damage of crops, livestock, infrastructure and human safety. One respondent claimed 'KWS came and said they would do something 'but when they go they forget about it. They know that people are being disturbed but they say ″you wait, you wait, you wait″'. Respondents also discussed 200,000 KES being too small a sum in compensation for the death of a person and mentioned that 3million KES was more appropriate, as per an unsuccessful bill taken to parliament. Obviously a monetary value cannot be place on human life but the argument the respondents make is that 200,000 does not cover the lost labour unit, particularly of a man in his twenties who would potentially have had decades more of labour contribution to the household in the future. Further, respondents claim that if the loss of human life from wildlife were more expensive for the government to bear then it might be in its best interest to be more proactive regarding human-wildlife competition and empathetic of the burden this puts on the common small-scale resource user.

Although none of the respondents had received compensation, one respondent stated that some farmers receive their compensation quickly if they have connections to either KWS directly or indirectly through another person with the appropriate social or political status. Yet, for the ordinary peasant farmer without such connections they must rely on the bureaucratic process. However other respondents, interviewed in a previous fieldwork period in 2011, discussed the option of abolishing the system of compensation in favour of a more equal distribution of tourism benefits into public goods such as education, health care and infrastructure. However, authors note that these community-level benefits often don't make up for the loss of benefits at the household or individual level (Leader-Williams & Hutton, 2005).

5.3 Other governance and policy issues

The compensation system and interactions with KWS highlight governance, yet there are several other institutional issues which contribute to the human-wildlife coexistence complexity which often stems from or cause human-human conflict. Central to this complexity is the land tenure system. Within Laikipia County there are no game parks within which to confine the wildlife, separated from agricultural and pastoral production areas, instead the wildlife moves through a combination or 'mosaic' of private, communal and government land (Graham et al., 2009). As one respondent stated 'they don't have a game park here, there's no game park where they can contain them [wildlife]…We've got to live with them, that's all they [government] tell us.' Both elephant and human population growth in addition to the excision of large tracts of land for private property, have led to the competition of resources between humans and wildlife. Elephants have moved into Laikipia, probably due to poaching in Northern Kenya, while at the same time humans have settled in the wildlife migratory corridors. Respondents noted how some of the people in the Gatundia area have migrated because the elephant raiding prevented them from harvesting a worthwhile crop. Yet without enough capital to buy land elsewhere, these people have moved to the slums of urban areas. Land tenure is a sensitive issue in Kenya and Laikipia is no exception. Many respondents feel that the current distribution of land among citizens is unequal and if conservancies have such large tracts of land then they should take more responsibility in ensuring that wildlife is restricted to their

properties and not roaming through farmers' crops.

The role of politics in the management of human-wildlife coexistence was also cited by respondents as a contributing factor to the associated conflict. Power relations dominated the decision-making processes and the role the conservation groups have in pressuring governments to act in favour of wildlife populations. In relation to actively assisting small-scale resources users, one respondent claimed:

> Our government is deaf, they can't hear anything… they are ignorant … The policy makers, they are people with ties and big stomachs … They promise you heaven and at the end of the day you find yourself in hell. But they're very comfortable. I think the issue here is the government and the pressures should come from these WWF. They have a lot of influence. Understand they bring in a lot of funding but it never reaches down to the common man. That is the issue…Some pressure has got to be brought in from this WWF, they are the people who have go the last word. In fact our government is very much concerned about the animals and they don't mind about the people… human wildlife conflict, they don't mind about it. And I think they have … their loyalties are to WWF and the money which comes from tourism, the impact of that money is not felt by the local communities. So… at the end of the day we are the losers.

Respondents perceive politicians being corrupt, yet they also see conservation groups as having particular political sway and influence over macro-level policies based on the government's reliance on funds provided by these stakeholders.

An issue raised by respondents was that of mid-level managers and on-ground staff being lazy, corrupt and unsympathetic towards small-scale natural resource users. However, through a sensemaking frame these employees or KWS rangers could be seen not as lazy or unsympathetic people actively making bad decisions but rather as employees of a government department with limited resources struggling to make sense of their mandated work. This sensemaking perspective does not absolve individuals of their moral and legal responsibilities in relation to corruption and decision-making, but rather suggests that any analysis should go beyond the identification or labelling of such decisions as 'bad' or 'corrupt' to the social and institutional structures which allow for these decisions to be made, as other studies have also suggested (Mullen et al., 2006). During interviews with KWS rangers in previous fieldwork periods the respondents often commented on the hardships faced by small-scale resource users in addition to the difficulties they faced in their own jobs. KWS rangers are often faced with humans complaining of elephants without acknowledging that they have settled in traditional elephant migration corridors or claimants that have submitted paperwork for compensation and expect their local KWS ranger to either make the decision or expedite the process, which is usually beyond that ranger's control. In this sense, these KWS employees can be seen as trying to make sense of the push and pull pressures placed on them from the various stakeholders within the human-wildlife complex and select courses of action which are plausible, retrospective and in line with their identity which may not suit certain stakeholders.

5.4 Conflict of interest between stakeholder groups

The above discussion in section 5 has shown that according to respondents there is a mismatch between the views or expectations of farmers and the priorities and policies set by 'outsiders'.

Respondents claimed that while policy makers and practitioners focus on new technologies to restrict the movement of elephants into cropland and farmers report these technologies to be inadequate, the policy makers and practitioners then seem to go back to the drawing board to develop another technology rather than opening up dialogue regarding the basic wildlife policies and management strategies. According to respondents, a great frustration behind having their crops destroyed by elephants and the fear of being injured or killed by an elephant is the inability to be involved in the decision-making processes of wildlife management which concern their livelihoods and personal safety directly. The view that conservationists and the government, through funding from conservation groups and income through tourism, are more interested in wildlife than humans perhaps stems from the disconnect between those who benefit from wildlife and those who bear the cost of wildlife and the inability of natural resource dependent people to influence wildlife management decisions. From this perspective a more open or discourse-oriented approach to wildlife management in Laikipia could open the dialogue to all relevant stakeholders, thereby creating a forum for innovative and transparent policy making processes.

6. Conclusion

The institutional, social and ecological contexts within which natural resource users are embedded contribute to their sensemaking processes. Evidence from this scoping study suggests that farmers are more willing to engage in risky behaviour, such as approaching an elephant in order to deter it, due to their perception that the compensation system is often slow or absent and therefore they 'must' defend their crop and income. Similarly, perhaps people rely on a phone call or verbal communication from neighbours to notice elephants within their crops and in the absence of these cues they are unable to notice and bracket inputs from the ecological context. More crucially, the noticing and bracketing of cues from the various contexts allows for actors to select courses of action which seem plausible based on their enacted worlds yet this plausibility does not promise accuracy. Several of the cases presented in this article showed that the most plausible course of action selected by respondents, didn't necessarily lead to a positive outcome for that individual. This is shown distinctly by respondent E who decided on a plausible course of action based on his noticing and bracketing of one elephant in his crop. Unfortunately there were three elephants in his crop and this perhaps gave the confidence to his opponent elephant to charge rather than retreat. Sensemaking theory has been used in this article as a framework for further research which aims to understand how people interact with wildlife and how this then informs their perceptions of wildlife management.

The article discusses the governance and institutional processes which surround wildlife management in Laikipia and posits that if these macro level policies or their micro-level implementations were to change this would change the context of natural resource users' contexts of human-elephant interaction and would ultimately alter their sensemaking processes. This may be through different cues to extract from the environment or possibly various policy changes may open a range of viable selection options which currently are unavailable or ill-advised for resource users currently. For example if future wildlife policies were to allow for extractive wildlife strategies or looser restrictions on killing problem wildlife, resource users may adopt and retain these different selection options. The objective of this article is not to make recommendations as to the appropriate policy of wildlife management in Kenya, but rather to highlight the relationship between actor and structure in making sense of unorganized situations. One recommendation to extend this line of thought would be that through a more inclusive and deliberative process of policy development, a broader range of stakeholders within the human-wildlife context will have a voice and perhaps subsequent ownership of that ensuing policy. This would ultimately provide an enabling

environment for clearer expectations from the future and perhaps assist in making sense of difficult and unorganised situations. This article has provided grounding for future research applying sensemaking theory to human-wildlife interactions.

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